

5.3.12 FACILITY DISPOSITION ACCIDENTS

5.3.12.1 Introduction

Purpose

The purpose of this section is to analyze alternatives for the disposition of INTEC facilities based on their potential for facility accidents during the disposition process. Each waste processing alternative and facility disposition option requires an analysis of potential facility accidents as one of the environmental impacts, particularly to human health and safety, associated with its implementation. An accident analysis is performed to identify environmental impacts associated with accidents that would not necessarily occur but which are reasonably foreseeable and could result in significant impacts. Since the potential for accidents and their consequences varies among different facility disposition options, facility disposition accidents may provide a key discriminator among the Idaho HLW & FD EIS alternatives. Accidents are defined per the National Environmental Policy Act as undesired events that can occur during or as a result of implementing an alternative and that have the potential to result in human health impacts or indirect environmental impacts.

Potential facility disposition accidents pose health impacts to several groups of candidate receptors, including workers at nearby INEEL facilities (noninvolved workers) and the offsite public who could be exposed to hazardous materials released during some accident scenarios. Potential facility disposition impacts to human health arise from the presence of radiological, chemical, and industrial (physical) hazards such as trauma, fire, spills, and falls.

Each waste processing EIS alternative affects or includes several major INTEC facilities, such as the New Waste Calcining Facility, Tank Farm, and bin sets. Clean Closure, Performance-Based Closure, and Closure to Landfill Standards are the three major alternatives that are being considered by DOE for each HLW facility disposition. The facility disposition alternatives that are currently under active consideration by DOE are evaluated below in the respective facility accident analyses.

Approach

The approach adopted by DOE is illustrated in Figure 5.3-11. As shown, potential facility disposition impacts for noninvolved workers and members of the offsite public are analyzed differently than for involved workers. Only involved workers are subject to hazards of an industrial nature, such as trauma, fire, spills, and falls. However, all three groups could be exposed to radioactivity and/or hazardous chemicals released by a severe accident. For assessing impacts to noninvolved workers and the offsite public, the maximum plausible accident identified for disposition of each facility is compared to the maximum postulated accident during normal operation of that facility. Data sources include documented safety analyses for HLW processes at INTEC or EIS estimates for bounding facility events that are included in waste processing alternatives. The comparisons between disposition events and corresponding operations accidents use relative changes in inventories of radioactive materials and hazardous chemicals, changes in mobility of these substances, and changes in the energy available for accident initiation and propagation. These changes occur to some extent while a facility undergoes deactivation. As discussed below, the combination of inventory reductions, immobilization of residuals, and removal of energy sources produces potential disposition impacts that are less severe than those posed by acceptable hazards from current operations. This analysis indicates that a maximum plausible disposition event for a given facility has significantly less potential impact than a corresponding operations accident. Thus, an inference can be made that risks at each facility would not be increased by prospective actions taken to implement an EIS alternative.

Involved workers would be exposed to numerous industrial physical hazards during facility disposition activities, in addition to hazards from residual chemicals and radioactive materials following facility deactivation. The industrial hazards to involved workers likely would not diminish when inventories of chemicals and radioactive substances are removed or immobilized. Thus, accidents such as falls from scaffolding are assumed to be independent of the radioactive and chemical inventories, the mobility of these materials, and the energy available to

Noninvolved Workers and the Offsite Public

Radiological Impacts to
Noninvolved Workers
and the Offsite Public

Chemical Impacts to
Noninvolved Workers
and the Offsite Public



Relative Comparisons of Maximum
Plausible Closure Event for a
Facility to Maximum Postulated
Accident during Operations



Establish that Maximum Closure
Event Impact is Less than from
Maximum Operations Accidents

Involved Workers

Impacts to
Involved Workers
from all Sources



Industrial Disposition
Hazards

Post-deactivation
Radiological and
Chemical Hazards



Compare Ranges of
Impacts to Involved Workers
among Closure Options

FIGURE 5.3-11.

Impact assessment methodology for
hypothetical disposition accidents in
INTEC facilities.

Environmental Consequences

release these inventories. DOE standards indicate (DOE 1998) the likelihood of industrial accidents may increase during facility disposition, relative to facility operations, because more industrial labor is required during active phases of disposition.

There is another reason why occupational impacts to involved facility workers cannot simply be bounded by the maximum postulated accident for operations in the same manner as for potential impacts to noninvolved workers and members of the offsite public. Many facility systems that mitigate consequences of operations accidents to involved workers, such as fire protection systems, may no longer be available during disposition, especially during latter phases such as demolition. It is also possible that involved workers may encounter unforeseen radiological or chemical hazards during disposition without the benefit of adequate protective equipment. For example, process tanks or lines that are declared empty in facility documentation may still contain enough radioactivity to require shielding or remote handling for disassembly.

For these reasons the strategy for involved workers reflected in Figure 5.3-11 is to compare the potential impacts from disposition accidents with respect to the closure options under consideration. This assessment is relatively straightforward for industrial hazards, where potential impacts (injuries/illnesses and fatalities) are assumed proportional to disposition labor hours. As discussed below, a Clean Closure requires more disposition labor than a Performance-Based Closure, which requires more labor than Closure to Landfill Standards. Consequently, Clean Closure poses the largest total risk of industrial accidents to involved workers, while Closure to Landfill Standards poses the least total risk. Similarly, impacts from radiological hazards in terms of total rem exposure are calculated from the estimated duration (hours) of radiation worker labor. Facility-specific hazards from hazardous chemical residues are more difficult to quantify with available information. However, inferences can be drawn by assuming that impacts are related to amounts of disposition labor under hazardous conditions, because Clean Closure requires more disposition activity in close proximity to chemical hazards, followed by Performance-Based Closure and then Closure

to Landfill Standards. Thus, potential impacts to involved workers from chemical residues should demonstrate the same trend among facility disposition alternatives as industrial and radiological accidents.

Scope

This analysis presents postulated facility disposition accidents that could occur during facility closure and have the potential to harm workers, the offsite public, and the environment. This analysis of facility disposition accidents was applied only to those existing INTEC facilities that are significant to the treatment, storage, or generation of HLW. New facilities required for the waste processing alternatives are not considered in the analysis because the design of these facilities has not been finalized and the designs would include features to facilitate decontamination and decommissioning (DOE 1989). Thus, new waste processing facilities would have minimal radioactive and hazardous material inventories remaining at the time of disposition and a low potential for significant accidents.

As described in Section 3.2.2 of this EIS, DOE used a systematic process to identify which existing INTEC facilities would be analyzed in detail for this EIS. These facilities selected for detailed analysis are assumed to have material inventories that require careful consideration of potential for accidental release into the environment at closure. The results of the DOE facility selection process are documented in Table 3-4. Table 5.3-22 is derived from Table 3-4 and forms the basis for the analysis of potential disposition impacts to involved workers in Section 5.3.12.5. This section also is applicable to inter-facility transport lines that are not directly associated with individual INTEC facilities.

Because current facility data on the type and quantities of miscellaneous hazardous materials were not available, no definitive analysis was done with respect to the chemical content and potential impact of incidental, hazardous materials at the facilities. These hazardous materials may include kerosene, gasoline, nitric acid, decontamination fluids, paints, etc. The assumption was made that closure activities would include the disposal and cleanup of these haz-

Table 5.3-22. Existing INTEC facilities with significant risk of accident impacts to noninvolved workers and to the offsite public.^a

Tank Farm	
CPP-713	Vault containing Tanks VES-WM-187, 188, 189, and 190
CPP-780	Vault containing Tank VES-WM-180
CPP-781	Vault containing Tank VES-WM-181
CPP-782	Vault containing Tank VES-WM-182
CPP-783	Vault containing Tank VES-WM-183
CPP-784	Vault containing Tank VES-WM-184
CPP-785	Vault containing Tank VES-WM-185
CPP-786	Vault containing Tank VES-WM-186
Bin Sets	
CPP-729	Bin set 1
CPP-742	Bin set 2
CPP-746	Bin set 3
CPP-760	Bin set 4
CPP-765	Bin set 5
CPP-791	Bin set 6
CPP-795	Bin set 7
Process Equipment Waste Evaporator and Related Facilities	
CPP-604	Process Equipment Waste Evaporator
CPP-605	Blower Building
CPP-649	Atmospheric Protection Building
CPP-708	Main Exhaust Stack
CPP-756	Prefilter Vault
CPP-1618	Liquid Effluent Treatment and Disposal Facility
Fuel Processing Building and Related Facilities	
CPP-601	Fuel Processing Building
CPP-627	Remote Analytical Facility
CPP-640	Head End Process Plant
Other Facilities	
CPP-659	New Waste Calcining Facility
CPP-666/767	Fluorinel Dissolution Process and Fuel Storage Facility and Stack
CPP-684	Remote Analytical Laboratory
a. Derived from Table 3-4 and Rodriguez et al. (1997).	

ardous materials to the maximum extent practicable in accordance with the current decommissioning manuals and regulations.

For occupational impacts to noninvolved workers and the offsite public, which are documented in Section C.4.2 of Appendix C.4 and summarized in Section 5.3.12.4, the facilities addressed were confined to those facilities where potential accidents could rapidly disperse radionuclides and/or hazardous chemicals beyond the immediate working area. Selection guidance was obtained from a prior study, the *Comprehensive RI/FS for the Idaho Chemical Processing Plant OU 3-13 at the INEEL Part A, RI/BRA Report* (Rodriguez et al. 1997), which identified those facilities with airborne release and direct exposure pathways. Facilities that pose short-term radiological and/or chemical hazards to uninvolved workers and the offsite public are presented in Table 5.3-22.

For purposes of this facility disposition accident analysis, HLW facilities that have only “groundwater pathways” for hazardous material releases were not assessed for potential impacts to uninvolved workers and the offsite public. Groundwater is not considered a viable short-term pathway for the following reasons. Facility disposition accident releases to the groundwater pathway are remediable and would not be expected to produce a short-term health impact to the public. Groundwater impacts are presented in potential Section 5.2.14, Facility Accidents, only when the potential consequence of an accident is so great that the cost of remediation was intractable and had to be assessed. Also, due to limitations on hazardous material inventory, accessibility, and available energy for release, the possibility of such large events can be categorically eliminated or least assumed to be bounded by the facility accidents already considered. Any long-term impacts via groundwater exposure pathways are addressed in Section 5.3.8.

During INTEC-wide operations, the bounding release scenario for hazardous chemicals with the greatest potential consequences to uninvolved workers and the offsite public is a catastrophic failure of a 3,000-gallon ammonia tank. (See Accident Analysis 15 in “Accidents with the Potential Release of Toxic Chemicals” in

Appendix C.4). As discussed in Section 5.2.14, this scenario results in ammonia releases greater than ERPG-2 concentrations at 3,600 meters. Here “exposures to airborne concentrations greater than ERPG-2 values for a period greater than 1 hour results in an unacceptable likelihood that a person would experience or develop irreversible or other serious health effects or symptoms that could impact a person’s ability to take protective action.” This accident scenario also bounds potential chemical releases for the facility disposition analysis cases summarized in Section 5.3.12.4.

5.3.12.2 Facility Disposition Alternatives

The three facility disposition alternatives considered by DOE and included in this analysis are defined below. (Subsequent use of the Tank Farm and bin sets for disposal of the low-level waste Class A or C type grout is not included here because accidents associated with this activity were addressed in Section 5.2.14.)

Clean Closure

Hazardous wastes and radiological and chemical contaminants, including contaminated equipment, would be removed from the facility or treated so that residual radiological and chemical contamination is indistinguishable from background concentrations. Clean Closure may require total dismantlement and removal of facilities. Use of facilities (or the facility sites) after clean closure would present no risk to workers or the public from radiological or chemical hazards.

Performance-Based Closure

Closure methods would be dictated on a case-by-case basis depending on risk. For radiological and chemical hazards, performance-based closure would be in accordance with risk-based criteria. The facilities would be decontaminated such that residual waste and contaminants no longer pose any unacceptable exposure (or risk) to workers or to the public. Post-closure monitoring may be required on a case-by-case basis.

Closure to Landfill Standards

The facility would be closed in accordance with state and Federal requirements for closure of landfills. Closure to Landfill Standards is intended to protect the health and safety of the workers and the public from releases of contaminants from the facility. Depending on the type of contaminants, this could be accomplished by installing an engineered cap, establishing a groundwater monitoring system, and providing post-closure monitoring and care of the waste containment system.

5.3.12.3 Analysis Methodology for Noninvolved Workers and the Offsite Public

Risks to uninvolved workers and the public from nuclear facility accidents are evaluated as part of an ongoing safety management process during nuclear facility operations. In the DOE safety management process, documents such as safety analysis reports are used to identify risks as well as risk mitigation measures that result in an acceptable level of safety assurance for facility operations. However, facility shutdown, decontamination, and dispositioning activities could pose additional risks to uninvolved workers and the public that do not exist during facility operations (for example by removing or compromising the integrity of barriers to the release of radioactive materials). The potential for such risks is identified as part of the EIS, and could present a basis for discriminating among facility disposition alternatives. A facility disposition accident analysis was performed to identify the potential for shutdown, decontamination and dispositioning activities to pose risks that are not enveloped by the standard safety assurance process.

The disposition accident analysis team performed a systematic review of available data from applicable INTEC safety analysis reports, safety reviews, HLW facility closure studies, and EIS technical data that were generated for Section 5.2.14, Facility Accidents. The maximum plausible accident scenario selected for the HLW facilities with airborne release and direct exposure pathways is compared to a bounding accident scenario that was postulated during nor-

mal facility operations in safety analysis reports or in Section 5.2.14 of this EIS.

Facility shutdown, decontamination, and disposition activities are not well defined at this time. The methodology used to evaluate facility disposition activities is intended to provide a comparison between bounding accident scenarios that could occur during facility disposition and those that could occur during facility operation. For each facility considered in the facility disposition alternatives, a maximum plausible accident scenario was identified using a systematic qualitative review process and compared with the maximum credible accident identified for facility operations from the safety assurance documents. The specific steps in this systematic evaluation process are described below, while the results of the qualitative accident scenario comparison are given in Table 5.3-23.

Facility Description

The analysis team collected and reviewed facility descriptions that were obtained from current EIS alternative treatment studies, EIS facility closure studies, INTEC reports and studies, LMITCO feasibility studies, and previous DOE HLW studies. The facility description reviews focused on the facility's operational function; primary activities; location at INTEC; structural materials; type of equipment and process lines; shielding provisions; heating, ventilation, and air conditioning systems; material inventories; and other factors pertinent to potential facility disposition accidents. Particular attention was placed on structure design and materials that could impact the safe, efficient, and complete removal of radioactive and hazardous materials.

Facility Disposition Condition

The DOE process identified three types of facility closures appropriate for HLW facility disposition: Clean Closure, Performance-Based Closure, and Closure to Landfill Standards. For the INTEC Tank Farm and bin sets, which would contain most of the residual radioactivity, all three facility disposition alternatives are under active consideration and were evaluated accordingly. A single facility disposition alternative

Table 5.3-23. Summary of facility disposition accidents potentially impacting noninvolved workers or the offsite public.

Facility number	Facility title	Clean closure	Performance	Landfill Stds	Material at risk at closure	Contaminant mobility at closure	Energy for accident at closure	Maximum plausible accident	Bounding operations accident
CPP-713	Vault for Tanks VES-WM-187, 188, 189, and 190	●	●	●	Low levels of radioactive and hazardous material	Low mobility ensured by pipe capping and filling the tanks with LLW Class C type grout or clean fill material	Low energy sources during MTRU waste (SBW) retrieval, removal of combustible materials, and routine decontamination	Rupture or break in the transfer lines during MTRU waste (SBW) retrieval operations	Flood-induced failure of bin sets, the design basis event for calcine storage in No Action and Continued Current Operations Alternatives
CPP-780 through CPP-786	Vaults for Tanks VES-WM-180-186	●	●	●	Low levels of radioactive and hazardous material	Low mobility ensured by pipe capping and filling the tanks with LLW Class C type grout or clean fill material	Low energy sources during MTRU waste (SBW) retrieval, removal of combustible materials, and routine decontamination	Rupture or break in the transfer lines during MTRU waste (SBW) retrieval operations	Flood-induced failure of bin sets, the design basis event for calcine storage in No Action and Continued Current Operations Alternatives
CPP-729, 742, 746, 760, 765, 791, and 795	Bin sets 1 through 7	●	●	●	Low levels of radioactive and hazardous material	Low mobility ensured by pipe capping and filling the bin sets with LLW Class C type grout or clean fill material	Low energy sources during Calcine Retrieval and Transport Project, removal of combustible materials, and routine decontamination	Rupture or break in the calcine transfer lines during Calcine Retrieval and Transport operations	Flood-induced failure of bin sets, the design basis event for calcine storage in No Action and Continued Current Operations Alternatives
CPP-604	Waste Treatment Building			●	Low levels of radioactive and hazardous material residue after cease-use removal activities	Low mobility potential for contaminants affixed to surfaces or trapped in inaccessible locations	Low energy sources due to routine closure activities and removal of combustible materials	Accidental fire during demolition activities could release contaminants beyond the working area	Criticality event releasing significant radioactivity to the atmosphere
CPP-605	Blower Building			●	Low levels of radioactive and hazardous material residue after cease-use removal activities	Low mobility potential for contaminants affixed to surfaces or trapped in inaccessible locations	Low energy sources due to routine closure activities and removal of combustible materials	Accidental fire during demolition activities could release contaminants beyond the working area	Chemical release due to ammonia gas explosion in the former NO ^x Pilot Plant during New Waste Calcining Facility testing
CPP-708	Main Stack			●	Low levels of radioactive and hazardous material	Low mobility potential for contaminants affixed to surfaces or trapped in inaccessible locations	Low energy sources due to gradual disassembly of stack	Accidental drop of stack segment during disassembly	Main stack toppled westward by earthquake, crushing CPP-756 prefilters and CPP-604 off-gas filter

Table 5.3-23. Summary of facility disposition accidents potentially impacting noninvolved workers or the offsite public (continued).

Facility number	Facility title	Clean closure	Performance	Landfill Stds	Material at risk at closure	Contaminant mobility at closure	Energy for accident at closure	Maximum plausible accident	Bounding operations accident
CPP-756 and 649	Prefilter Vault and Atmospheric Protection System Building			●	Low levels of radioactive and hazardous material residue after cease-use removal activities	Low mobility ensured by pipe capping and installation of a site protective cover during closure activities	Low energy sources due to routine closure activities and removal of combustible materials	Accidental fire during demolition activities could release contaminants beyond the working area	Fire that begins in prefilters and spreads to all 104 final HEPA filters, releasing radioactivity to the atmosphere
CPP-1618	Liquid Effluent Treatment & Disposal Building	●			Low levels of radioactive and hazardous material residue after cease-use removal activities	Low mobility potential for contaminants affixed to surfaces or trapped in inaccessible locations	Low energy sources due to routine closure activities and removal of combustible materials	Accidental fire during demolition activities could release contaminants beyond the working area	Explosion in fractionator releasing radioactivity to the atmosphere
CPP-601	Fuel Processing Building		●	●	Low levels of radioactive and hazardous material residue after cease-use removal activities	Low mobility potential for contaminants affixed to surfaces or trapped in inaccessible locations	Low energy sources due to routine closure activities and removal of combustible materials	Accidental fire during demolition activities could release contaminants beyond the working area	Criticality event releasing significant radioactivity to the atmosphere
CPP-627	Remote Analytical Facility		●	●	Low levels of radioactive and hazardous material residue after cease-use removal activities	Low mobility potential for contaminants affixed to surfaces or trapped in inaccessible locations	Low energy sources due to routine closure activities and removal of combustible materials	Accidental fire during demolition activities could release contaminants beyond the working area	Radionuclide spill in the CPP-627 cave; classified as an abnormal event
CPP-640	Head End Process Plant		●	●	Low levels of radioactive and hazardous material residue after cease-use removal activities	Low mobility potential for contaminants affixed to surfaces or trapped in inaccessible locations	Low energy sources due to routine closure activities and removal of combustible materials	Accidental fire during demolition activities could release contaminants beyond the working area	Transfer cask criticality initiated by addition of water moderator to 24 Rover fuel tubes
CPP-659	New Waste Calcining Facility		●	●	Low levels of radioactive and hazardous material residue after cease-use removal activities	Low mobility potential for contaminants affixed to surfaces or trapped in inaccessible locations	Low energy sources due to routine closure activities and removal of combustible materials	Crane drops or equipment malfunctions during decontamination or demolition activities	Flood-induced failure of bin sets, the design basis event for calcine storage in No Action and Continued Current Operations Alternatives

Table 5.3-23. Summary of facility disposition accidents potentially impacting noninvolved workers or the offsite public (continued).

Facility number	Facility title	Clean closure	Performance	Landfill Stds	Material at risk at closure	Contaminant mobility at closure	Energy for accident at closure	Maximum plausible accident	Bounding operations accident
CPP-666 and 767	Fluorinel and Storage Facility and Stack	●	●		Low levels of radioactive and hazardous material residue after cease-use removal activities	Low mobility potential for contaminants affixed to surfaces or trapped in inaccessible locations	Low energy sources due to routine closure activities and removal of combustible materials	Accidental fire during demolition activities could release contaminants beyond the working area	Criticality event in Spent Nuclear Fuel Storage Area
CPP-684	Remote Analytical Laboratory		●		Low levels of radioactive and hazardous material residue after cease-use removal activities	Low mobility potential for contaminants affixed to surfaces or trapped in inaccessible locations	Low energy sources due to routine closure activities and removal of combustible materials	High winds disperse residual contaminants freed during routine demolition activities	Failure of CPP-684 containment releasing entire contents of Analytical Cell

LLW = low-level waste; MTRU = mixed transuranic

was considered for the remaining INTEC facilities, except for the Fuel Processing Complex (CPP-601/627/640) and the New Waste Calcining Facility where two facility disposition alternatives were evaluated. The material inventories associated with these facilities would be much less than that of the Tank Farm and bin sets. Therefore, the overall residual risk from closure of INTEC HLW facilities would not change significantly due to the contribution of a potential accident for these facilities. Also, the type of closure is considered when the analyst is estimating the critical factors bearing on a bounding accident: material at risk, energy, and mobility.

Material at Risk at Closure

The severity or eventual consequences of any potential facility disposition accident is directly proportional to the type, quantity, and potential energy of material at risk and the resultant source term. For this analysis, it is assumed that the most of the materials at risk would be removed during the facility cease-use period prior to closure activities. However, the estimated material at risk could be much greater if significant quantities of radioactive and hazardous materials were inadvertently “left behind” in areas that are assumed to be clean.

In the case of the bin sets, the Calcine Retrieval and Transport Project along with subsequent closure activities would reduce the quantities of material at risk by nearly two orders of magnitude below normal operation levels. This significant reduction in material inventory during facility closure activities is one of the primary assumptions that supports the selection of bounding accidents from operational scenarios to bound potential impacts of lesser closure accidents.

Contaminant Mobility at Closure

Contaminant mobility in the facility environment is a function of the type and construction of the facility, the location of the facility with respect to exposure pathways, the characteriza-

tion and location of the contaminants, and the type of closure operations. These mobility factors and others were considered by the facility disposition accident analysis team in estimating the potential contaminant mobility for each type of HLW facility. In facilities where most of the residual contamination was left in tanks or internal bins or otherwise inaccessible places, the contaminant materials were deemed relatively unavailable for release and not susceptible to natural or external phenomena accident initiators.

Available Energy for Accident at Closure

As was the case for determining bounding accident scenarios during the treatment alternative operations (documented in Section 5.2.14), the accident “initiating events” considered for the facility disposition alternatives include fires, explosions, spills, nuclear criticality, natural phenomena, and external events. Internal initiators such as human error and equipment failures occur during operations that trigger the fires, explosions, and spills. Natural phenomena initiators include floods, tornadoes, and seismic events. External initiators include human-caused events during decommissioning, decontamination, closure, or an unrelated aircraft crash. Generally, the external initiators are the most probable initiators for bounding facility accidents that cause major structure damages and materials releases to the environment.

Maximum Plausible Accident at Closure

The maximum plausible accident is the largest credible accident during facility closure that could be hypothesized using available information. Determination of the maximum plausible accident provides an “accident benchmark” for the analyst to confirm that comparison with a “bounding operations accident for facility operations” results in greater consequences than the postulated maximum plausible facility disposition accident. Also, it is worthwhile to address any possible accident scenarios during closure because the review process may highlight the

need for additional safety procedures or equipment to be considered in future safety analysis reports.

5.3.12.4 Facility Disposition Accident Summary for Noninvolved Workers and the Offsite Public

Table 5.3-23 summarizes the basis for identifying the maximum plausible accident scenarios during facility disposition and comparing them with the maximum credible accidents during facility operation. In each comparison, the potential for release is substantially smaller during facility disposition than it is during facility operation (typically several orders of magnitude smaller). The comparisons in Table 5.3-23 indicate that inventories of radioactive and chemically hazardous materials that would be available at the time facilities are turned over for disposition are typically a small percentage of those present during facility operation. In addition, materials present during facility disposition are typically not in a highly releasable form, and there are very limited energy sources such as elevated temperatures and pressures that would support release and dispersion of radioactive materials.

Conversely, normal mitigation systems (e.g. lighting, fire protection) may not be available during facility disposition activities, and there may be an increased potential for worker exposure to radiological and chemically hazardous materials (for example, during removal of piping and tanks in and around facilities). The data in Table 5.3-23 indicate that, while facility disposition activities may compromise designed safety features to control the release of radioactive materials, it is unlikely that facility disposition risks would exceed those that exist during facility operations. It can be concluded from the facilities disposition evaluation that facility disposition accidents do not pose a significant threat of health impacts to uninvolved workers or the public and do not provide a discriminator among facility disposition alternatives.

5.3.12.5 Impact of Facility Disposition Accidents on Involved Workers

During implementation of facility disposition alternatives, involved workers may incur health effects from several sources, particularly during physically intensive disposition phases, such as decontamination and demolition. Hazards to involved workers are posed by industrial accidents (e.g., falls from ladders) from increased occupational dosage as a result of accidental exposure to radiological and chemical contamination and from any radiological and chemical release accidents during disposition that impact involved workers but not uninvolved workers or the public. Specific hazards and their associated risks to involved workers will vary among facilities and the facility disposition alternatives selected for them. In general, Clean Closure requires more interaction between workers and hazards than Performance-Based Closure, while a Closure to Landfill Standards requires the least interaction.

Table 5.3-24 presents the analysis results for industrial impacts to involved workers based on facility closure alternative. The analysis methodology is detailed in Appendix C.4, but the basic assumption is that involved worker risk is directly proportional to the total worker hours for disposition of each facility. Estimated total worker hours were multiplied by average hazard incident rates from DOE and U.S. Government records described in Appendix C.4. These DOE rates are 6.2 injuries and illnesses and 0.011 fatalities per 200,000 hours; the private rates are 13.0 and 0.034 respectively. This methodology is generally in agreement with Section 5.3.8; however, this analysis distinguishes worker fatalities from injuries, rather than combining them as OSHA-recordable cases. This analysis further uses a construction injury rate that reflects historical incidents both to Management and Operating Contractor employees and to construction subcontractor employees.

Thus, to determine the total incidents by facility disposition alternative in Table 5.3-24, the average DOE-Private Industry rates of 9.6

injuries/illnesses and 0.23 fatalities per 200,000 hours were used. Note that “Other Facilities” incidents consist of the sum of the incidents for all the facilities except the Tank Farm and the bin sets, i.e. Tank Farm Related Facilities, bin set Related Facilities, Process Equipment Waste Evaporator and Related Facilities, Fuel Processing Building, and Related Facilities, FAST/FAST Stack, New Waste Calcining Facility, and Remote Analytical Laboratory. Since data for all three facility disposition alternatives were not available for all the Other Facilities, the total man-hours were assumed to be the same for all three facility disposition alternatives in the table. This assumption, that the incident data will be the same order of magnitude for all facility disposition alternatives, is considered conservative and will have no significant impact on the trend of the “Total Incidents” and the conclusion that Clean Closure has the most incidents.

Table 5.3-24 reveals significant differences among closure options for the Tank Farm and bin sets. (Labor estimates are not consistently

available for all options being considered for the other facilities.) Clean Closure has by far the greatest number of injuries/illnesses and fatalities, while the Performance-Based Closure Alternative has fewer incidents, and the Closure to Landfill Standards Alternative has the least estimated incidents.

Appendix C.4 calculates exposure to involved workers using estimated radiation worker labor and exposure rates in facility closure studies and engineering design files. Results indicate that the greatest negative impacts to involved workers are predicted for Clean Closure, followed by Performance-Based Clean Closure, and then by Closure to Landfill Standards. As with industrial accidents, Clean Closure is estimated to result in significantly higher impacts than the other two disposition impacts. Appendix C.4 does not provide quantitative estimates of involved worker risk from chemical hazards, but it suggests that chemical impacts likely will follow the same trend as found for industrial and radiological hazards.

Table 5.3-24. Industrial hazards impacts during disposition of existing HLW facility groups using “average DOE-private industry incident rates (per 200,000 hours).”

Facility groups	Clean Closure		Performance-Based Closure		Closure to Landfill Standards	
	Injuries/illnesses	Fatalities	Injuries/illnesses	Fatalities	Injuries/illnesses	Fatalities
Tank Farm	750	1.8	30	0.07	16	0.04
Bin sets	130	0.32	100	0.24	48	0.11
Other facilities	150	0.33	150	0.33	150	0.33
Total incidents	1000	2.4	280	0.64	210	0.48